**Coherence Measurements for Excited to Excited State Transitions in Barium**

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Experimental studies concerning elastic and inelastic electron scattering by coherently prepared ensembles of Ba (...6s6p $^1P_1$) atoms with various degrees of alignment will be described. An in-plane, linearly-polarized laser beam was utilized to prepare these target ensembles and the electron scattering signal as a function of polarization angle was measured for several laser geometries at fixed impact energies and scattering angles. From these measurements, we derived cross sections and electron-impact coherence parameters associated with the electron scattering process which is time reverse of the actual experimentally studied process. This interpretation of the experiment is based on the theory of Macek and Hertel *(J. Phys. B*, 7, 2173, 1974). The experimental results were also interpreted in terms of cross sections and collision parameters associated with the actual experimental processes. Results obtained so far will be presented and plans for further studies will be discussed.

electron collisions